REMARKS

Claims 9-20 are pending in the application. By this paper, claim 10 has been amended and new claims 21-28 have been added. Reconsideration and allowance of claims 9-28 is respectfully requested.

Prior Art Rejections

Claims 9, 11, 12, and 14-19 stand rejected under 35 U.S.C. § 102(b) as being anticipated by US patent number 5,810,926 to Legoues, et al. ("Legoues"). Further, claims 10 and 13 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Legoues in view of US patent number 5,569,538 to Cho ("Cho").

The present invention

The claimed invention is directed to providing a semiconductor component having a stress generating layer, a stress transmission layer and a stress absorbing layer. It is known to increase charge carrier mobility in a semiconductor by using stress-absorbing layers, for example, in the channel region of a field effect transistor. Page 1, lines 29-33 of the present application. Increased carrier mobility results in improved insulation properties and reduced leakage current, as well as reduced capacitances in the component. Page 2, lines 16-21. However, the conventional process and component did not permit further reduction in feature sizes, for example, in the sub-100 nm range, or further improvement of electrical properties. Page 3, lines 5-9.

Therefore, the novel features of the presently claimed invention include the introduction of a stress transmission layer on the stress generator layer for transmitting the mechanical stress that has been generated and a stress-absorbing layer on the stress transmission layer for the purpose of absorbing the mechanical stress. Preferably, the stress generating layer has a first lattice constant and the stress absorbing layer has a second lattice constant which is different from the first lattice constant. A structure produced in accordance with the claimed method enjoys the unique benefits described above.

The cited prior art fails to include all the limitations of independent claim 9

Legoues actually relates to semiconductors combining layers which are not lattice matched, and managing the defect density in such semiconductors. Reducing the defect density to allow reliable production of a device is the goal of Legoues. "[I]t has not been possible to produce fully relaxed structures wherein the epitaxial layer has sufficiently low defect densities to be suitable for any useful purpose." Column 2, lines 43-46. Legoues' goal is to produce "an incommensurate film" in the top layer, where active devices are formed, an incommensurate layer being one which is fully relaxed or free of lattice mismatches that cause defects. Column 2, lines 55-56; column 4, lines 25-39.

As such, Legoues fails to include a stress stress-absorbing semiconductor layer or an insulating stress transmission layer as recited by claim 9. Rather than transmitting or absorbing stress from layer to layer through the semiconductor, Legoues instead *migrates the stress or strain to edges of layers*:

> Misfit dislocations in layers 16, 18, 22, 40, 42 and 44 nucleate and migrate to the respective edges of those layers to relieve strain due to the lattice mismatch whereby an incommensurate film is formed in the terminal layer.

Column 7, lines 35-42. See also column 4, lines 35-39; FIG. 3 and column 8, lines 17-36. Thus, instead of layers which transmit and absorb stress as are featured in claim 9, Legoues instead discloses layers in which misfit dislocations "will turn and move horizontally towards the edge of the layers and stay within layers 16 or 18." Column 8, lines 20-22.

The Office Action relies on Legoues column 15, lines 13-24 as showing a CaF_2 stress transmission layer. However, this passage does not relate to a stress transmission layer, but to elimination of stress: "Deposition of the CaF_2 layer will provide a structure which can be fully relaxed and of low defect density to all the formation of another Si:Ge layer of varying composition than another Si layer thereover." Thus, instead of transmitting stress from a lower, stress generating layer to an upper stress absorbing layer as in claim 9, Legoues' CaF_2 layer forms an insulating layer which is lattice-matched to adjacent silicon layers to provide "high quality silicon layers." Legoues does not disclose a stress transmission layer.

Moreover, Legoues fails to even appreciate the benefits to be provided by forming an insulating stress transmission layer and a crystalline, stress-absorbing layer on the semiconductor. As the present application notes, "by using a crystalline stress generator layer formed on a carrier material and an insulating stress transmission layer formed thereon, it is possible for the stresses which are generated and transmitted to be absorbed in a stress-absorbing semiconductor layer formed thereon to such an extent that on the on e hand an improved charge carrier mobility is established and on the other hand improved electrical properties can be achieved in the semiconductor component." Page 4, lines 22-31. The improved carrier mobility is made possible by the presence of the stress-absorbing layer. In contrast, Legoues has a goal of forming an incommensurate film in the terminal layer, e.g., the layer in which active devices are formed. Such an incommensurate layer would completely miss the benefits of improved carrier mobility provided by the presently claimed invention.

The other cited reference, Cho, does not provide the missing features. Cho shows general semiconductor processing such as molecular beam epitaxy for SOI applications. This is not closely related to the claimed invention.

Accordingly, reconsideration and allowance of the pending claims are respectfully requested.

New Claims

New claims 21-28 have been added to claim additional disclosed but unclaimed subject matter. These claims find support throughout the application. No new matter is added by these claims. Review and allowance of new claims 21-28 is respectfully requested.

Objection to the Claims

Claim 10 stands objected to based on the recitation "the semiconductor substrate having a (100) surface orientation," in lines 1 and 2. Accordingly, the recitation of claim 10 has been changed to "a semiconductor substrate having a (100) surface orientation" *(emphasis added)*. Withdrawal of the objection to the claims is respectfully requested.

Objection to the Specification

The Specification stands objected to in that the title is considered not descriptive. Accordingly, the title of the Specification has been amended to -- SEMICONDUCTOR COMPONENT WITH STRESS-TRANSMISSION LAYER AND CORRESPONDING PRODUCTION METHOD --. It is submitted that this title reflects unique features of the invention such as the stress transmission layer 2 (FIG. 3A). Withdrawal of the objection to the specification is respectfully requested.

With this response, the application is believed to be in condition for allowance. Should the examiner deem a telephone conference to be of assistance in advancing the application to allowance, the examiner is invited to call the undersigned attorney at the telephone number below.

Respectfully submitted,

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